

Patent Application of
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For

Apparatus and Method for Repairing Flooring Tile

Background - Field of Invention

The apparatus generally relates to grouted ceramic, marble, stone, or porcelain flooring tiles that have separated in part from the underlying foundation for the purpose of resetting them properly.

Background - Description of Prior Art

Repair of grouted flooring tiles that have separated from the base structure is currently done by chipping or cutting out the surrounding grout first. Second the tile must be pried out using a chisel hammered under the tile however, chances are good that the tile will crack at or near where the prying force on the chisel was applied. If the job is successful then the tile and underlying structure are properly cleaned and the old tile is reset using a thin-set mortar or other comparable adhesive. If the tile cracks during the procedure then a new tile must be substituted. The problem is that if the new tile does not match the

surrounding tile floor then the appearance of the floor is greatly diminished. Separation can occur because of a shift in the foundation, poor application of thin-set mortar, or a lack in the expansion joints. If a separated tile is not repaired then it will crack with time and normal use.

Prior art attempted to solve this problem of repairing separated tiles in two ways. The first was injecting an adhesive under the tile through a drilled hole illustrated by DiStefano #5,000,890. This method does address salvaging the original tile but there are three problems with this method. First, the equipment required for the job is expensive. Second, the machines are complicated to operate for an ordinary person making this method of repair only available to an experienced technician. Third, the injected adhesive may not be able to penetrate and flow into all of the hollow spaces between the tile and the foundation to provide adequate and proper setting of the tile. If the adhesive injection is still unsuccessful then removing the tile intact by conventional methods will be near impossible and would have to be chipped out in pieces. The end result to the consumer is a higher cost and less than a high probability of success and in a worst case scenario leaving only a destructive method of tile removal and replacement with a new tile.

The alternative is to forgo any repair of an individual tile and instead remove the separated tile in pieces and replace it with a new one. The first of the destructive methods to remove the tile uses a torch to crack the tile then remove the pieces and is illustrated by Gerbasi #6,027,174. The second is to use a mechanized chipper to

break the tile and is illustrated by Holder #6,523,906 and Worden #5,713,637.

OBJECTS AND ADVANTAGES

Some of the objects and advantages over prior art of the apparatus are as follows:

- (a) to recover the separated tile intact so that it can be reset properly;
- (b) to minimize the cost to the consumer by allowing one not skilled the art to accomplish the job on his own due to the lower threshold of expertise and equipment required for the job over an adhesive injection method;
- (c) to provide a viable alternative to destructive method repairs;
- (d) to provide an apparatus and method to more reliably recover a separated tile over the current tile removal technique utilizing hammer and chisel type hand tools.

DRAWING FIGURES

Fig. 1 is an isometric view not including hidden lines. The hidden lines were omitted here to minimize clutter.

Fig. 2 is a front view from the position of the tile clamps.

Fig. 3 is another embodiment using a top view showing length adjustability of the apparatus.

Fig. 4 is a top view of the base plate only.

Fig. 5 is a right side view of the base plate only.

Fig. 6 is a top view excluding the base plate nuts and tile clamp bolts.

Fig. 7 is a right side view of the clamp guide rod and tile clamp and tile clamp riser.

Fig. 7a is a right side view of clamp guide rods, tile clamps and tile clamp risers using flat bar material instead of angle iron.

REFERENCE NUMERALS IN DRAWINGS

10	base plate	18L	spring lug
10A	base plate	22	spring
10B	base plate	26	tile hook
14	base tang	30	clamp guide tube
15	base cleat	34R	clamp guide rod
18R	spring lug	34L	clamp guide rod
18C	spring lug	38R	tile clamp

38L tile clamp	50L width-adjustment nut support
42R tile clamp riser	54 tile
42L tile clamp riser	58 adjustment plate
46R width adjustment nut	62A adjustment bolt
46L width adjustment nut	62B adjustment bolt
48R tile clamp bolt	66A length adjustment nut
48L tile clamp bolt	66B length adjustment nut
50R width-adjustment nut support	70R lock nut
	70L lock nut

Summary

To recap, the apparatus is designed to remove a partially separated flooring tile intact so that the original tile can be reset properly.

Description - Figs. 1-7

A typical embodiment of the apparatus is illustrated in **Fig. 1**, and an alternate embodiment is shown in **Fig. 3** using different material, a reversal in one component, and another adjustable component.

The entire structure is made of a rigid material usually steel. A base plate 10 can be made of welded pieces of steel or solid cut from plate material. The "I" shape was chosen to reduce weight and improve aesthetics of the apparatus. The rear of the apparatus is comprised of a base cleat 15 and a base tang 14 as shown in Figs. 1, 3, 4, 5,. Base cleat 15 is attached to base plate 10 and base tang 14 is attached to base cleat 15.

A spring lug 18L, a spring lug 18C and a spring lug 18R are attached to base plate 10 at different intervals and at different distances from front of base plate 10 as shown in Figs. 1, 3, 5. The purpose of spring lugs 18L, 18C and 18R are to act as an attachment for a spring 22. A tile hook 26 attaches to tile 54, near front of base plate 10, which in turn attaches to spring 22 which in turn attaches to one of the spring lugs 18L, 18C or 18R depending on the amount of tension needed. This tension or pressure minimizes the chance of chipping or cracking tile 54 during the hammering process.

A clamp guide tube 30, a round pipe, is attached to the front of base plate 10 and extends the entire width of base plate 10. Clamp guide tube 30 houses two clamp guide rods 34R and 34L which are round and solid. Different size tiles can be accommodated because clamp guide rods 34R and 34L can be extended to varying widths and they move freely within clamp guide tube 30. See Figs. 5, 6 for illustration. At the outward end of clamp guide rod 34R is attached a tile clamp 38R and a tile clamp riser 42R. At the outward end of clamp guide rod 34L is attached a tile clamp 38L and a tile clamp riser 42L. Tile clamp riser 42R and 42L are attached vertically and perpendicular to tile

clamp 38R and 38L respectively. Tile clamps 38R and 38L, and tile clamp riser 42R and 42L can be made of different shaped materials and one that is shown is angle iron as in Figs. 1, 7.

A tile clamp bolt 48R and a tile clamp bolt 48L are interchangeable depending which side the user wants to make hand adjustments. In Fig. 1 tile clamp bolt 48R has the handle to be used to tighten and loosen the apparatus from tile 54, and tile clamp bolt 48L is used as a width setting guide needing adjustment only when a different size tile is encountered. Tile clamp bolt 48R fits through a hole in tile clamp riser 42R and bolts to width adjustment nut 46R. Tile clamp bolt 48L fits through a hole in tile clamp riser 42L and bolts to width adjustment nut 46L. Width adjustment nut 46R is supported above clamp guide tube 30 by a width adjustment nut support 50R. Width adjustment nut 46L is supported above clamp guide tube 30 by a width adjustment nut support 50L. The width-clamping action secures the apparatus along both sides of tile 54 where clamps 38R and 38L contact tile 54.

Some differences are illustrated in an alternate embodiment shown in Fig. 3, 7a. Base plate 10 is two separate pieces, a base plate 10A and a base plate 10B, and is held together by an adjustment plate 58. Base plate 10A is secured to adjustment plate 58 by an adjustment bolt 62A and a length adjustment nut 66A. Base plate 10B is secured to adjustment plate 58 by an adjustment bolt 62B and a length adjustment nut 66B. This set up allows for changing the length of the apparatus to fit various situations or different sized tile by loosening length adjustment nuts

66A and 66B, changing the to the length, then tightening length adjustment nuts 66A and 66B.

In Fig. 3 spring lug 18L is set further back because it would interfere with some of the other components of the apparatus. In the case of the embodiment illustrated in Fig. 3 spring lugs 18C and 18R can be eliminated. In their place a different spring 22 can be used to change the tension required for the different sized tile.

Tile clamps 38R and 38L, and tile clamp risers 42R and 42L can be made of differently shaped materials and another one shown in Figs. 3, 7a is flat bar.

A tile clamp bolt 48R and a tile clamp bolt 48L are interchangeable depending which side the user wants to make hand adjustments. Tile clamp bolt 48R fits through a hole in tile clamp riser 42R and bolts to width adjustment nut 46R. Tile clamp bolt 48L fits through a hole in tile clamp riser 42L and bolts to width adjustment nut 46L. Width adjustment nut 46R is supported above clamp guide tube 30 by a width-adjustment nut support 50R. Width adjustment nut 46L is supported above clamp guide tube 30 by a width-adjustment nut support 50L. Lock nut 70R attaches tile clamp bolt 48R to clamp riser 42R because the bolt head is on the inside of base plate 10A. Lock nut 70L attaches tile clamp bolt 48L to clamp riser 42L because the bolt head is on the inside of base plate 10A. The width-clamping action secures the apparatus along both sides of tile 54 where clamps 38R and 38L contact tile 54. See Figs. 3, 7a for illustration.

In all embodiments, an isolation membrane is placed between tile 54 and three of the apparatus contact areas - tile clamp 38R, tile clamp 38L, and base cleat 15.

As described above the apparatus allows tiles to be removed intact so that both the tile and the foundation surface can be prepared for resetting of the original tile.

Operation - Figs. 1, 2, 4, 5, 6, 7

Prior to actual removal of a separated tile 54 from the foundation, the grout and any mortar surrounding this tile must be removed. The grout should be sawed out and not chipped out because hand chipping or using a mechanical chipping tool could damage the tile prior to its removal. Removal is complete when the underlying foundation can be seen in the space between the tiles. One reason that complete vacancy of the space is essential is because during the hammering and actual removal process, the tile moves forward as it breaks loose from its mortar bed and needs the space to move. Another reason is that the apparatus needs adequate space so that a base cleat 15, a tile clamp 38R and a tile clamp 38L can fit into this space and the apparatus will sit full depth.

After the grout has been properly removed from around tile 54, the apparatus is placed over it and base cleat 15, tile clamp 38R and 38L are fit into the appropriate spaces around tile 54. Before the apparatus is secured to tile 54 an isolation membrane is put between the edge of tile 54 and tile clamps 38R and 38L, and between the edge of tile 54 and base cleat 15. The width between the clamps is adjusted by screwing in or out a tile clamp bolt 48R and a tile clamp bolt 48L. In this embodiment tile clamp bolt

48L serves as a width setting bolt for tile 54. Tile clamp bolt 48L needs to be adjusted only when a different size tile is encountered. Tile clamp bolt 48R tightens or releases tension on tile 54. If needed tile clamp bolts 48L and 48R can be switched if the handle would be better on the other side of the apparatus.

Hooked to the front of tile 54 is a tile hook 26 which is attached to a spring 22 which is attached to a spring lug 18R, 18C or 18L to provide tension between the apparatus and tile 54.

After centering the apparatus by adjusting tile clamp bolt 48L then tile clamp bolt 48R is turned clockwise until snug. The apparatus should be firmly attached to tile 54 but not so tight that it would crack under the width adjustment tension.

A base tang 14 is then struck several times until the tile moves forward. At this point no further hammering is needed and the tile can be lifted from its spot. Do not use a light weight hammer or sledge hammer for the job. Only enough power in the blow to base tang 14 to break the seal is needed. An excess of power will damage tile 54 and an insufficient amount of power will not jar tile 54 loose.

After tile 54 is removed, both the tile and the foundation must then be cleaned of old mortar. The tile can then be reset.

Another embodiment is shown in Figs. 3, 7a. Tile clamp bolts 48R and 48L are now adjusted on the inside portion of the apparatus instead of on the outside as in the operation

above. Also the apparatus can be adjusted lengthwise through the use of an adjustment plate 58 that attaches a base plate 10A and to a base plate 10B. Once the correct length is set then a length adjustment nut 66A and a length adjustment nut 66B are tightened. The rest of the removal process is the same as the above embodiment.

Summary, Ramifications, and Scope

Accordingly, the user of the apparatus can reset a separated tile because the original tile can be recovered intact thereby keeping the floor whole and uniform. This is an improvement over the existing method of repair, namely destructive removal and replacement with new tile, and is a viable alternative to adhesive injection. The apparatus provides for cost savings to the consumer because no new tiles are needed and only those tiles that are separated need repairing.

Thus the scope of the apparatus should be determined by the appended claims and their legal equivalents, rather than by the examples given.